

REMARKS

Submission of Corrected Drawings

Applicants acknowledge the Examiner's remarks that the drawings submitted on July 22, 2003 are acceptable subject to correction of the informalities indicated on form PTO-948.

Applicants submit herewith ten sheets of drawings (Figures 1-12) correcting the informalities indicated by the "Notice of Draftperson's Patent Drawing Review." These changes include removing copy marks as well as providing more legible numbers and reference characters.

Applicants request entry of the substitute drawings.

Submission of Substitute Specification

The Examiner has also requested the submission of a substitute specification using line spacing of 1.5 or double spaced. Transmitted herewith is a copy of the substitute specification, using 1.5 line spacing, wherein the amendments to the specification and the claims, as indicated above, have been incorporated. To assist the Examiner's review, the requested substitute specification is provided both as a clean copy and one indicating the amendments to the specification. The amendments do not introduce any new matter.

Response to Claim Rejections

The claims have been amended to more clearly state that which applicants believe to be their invention. More particularly, claims 1, 7 and 17 have been amended to incorporate the limitation of original claim 2. Claim 10 has been amended to recite that the additional thermal interface element allows heating or cooling of the microarray device by allowing heat exchange

with a heat transfer means. Support for the amendment to claim 10 is found in original claim 5 and on page 10, lines 1-3. Claims 25 and 26 have been amended to specifically recite that the pipette has been adapted to perform the additional recited functions. Support for the amendment to claims 25 and 26 is found on page 14, lines 6-9. New claims 29-31 have been added to recite an additional embodiment of the present invention wherein the inlet is at a lower elevation than the outlet. Claims 30 and 31 further specify the orientation of the inlet and the outlet relative to one another and the active surface of the microarray. Support for new claims 29-31 is found in Figs. 1 and 2.

Claims 1-14, 17 19 and 21-28 stand rejected under 35 USC § 102(e) as being anticipated by Shumate (US 2003/0082632). Applicants respectfully traverse.

The presently claimed device relates to a cartridge holder of a microarray device designed for an automatic pipetting system for automatically dispensing liquids to communicate with the microarray device. The liquid is supplied into a chamber holding the microarray device in a manner that enables complete and bubble free filling of the chamber space. As noted at page 5, lines 20-23, the use of applicants' unique device ensures that the entire active surface of the microarray device is contacted by said liquid thus leading to consistent reliable test results. The device disclosed in Shumate fails to teach or suggest a device having a chamber that completely fills with liquid.

The Shumate reference discloses an apparatus having a chamber and a chamber inlet and outlet for moving liquids through the chamber. Shumate discloses that locations of the chamber inlet and outlet can be varied relative to one another. However, in all embodiments disclosed by Shumate, the channel connecting the chamber space with the outlet port is located in the side wall of the chamber. Accordingly, liquids introduced into the chamber will begin to flow out of

the chamber through the outlet channel before the chamber is completely filled with the liquid. Accordingly an air pocket (bubble) will be formed between the top "sealing film" and the column of liquid filling the chamber.

Claim 1 has been amended to specify that the cartridge is held in such a position within the system that the chamber inlet is positioned in the chamber at a lower height than the chamber outlet, such that complete and bubble free filling of the space between the optical interface and the active surface of the microarray occurs prior to the discharge of any liquid through the chamber outlet. Thus the presently claimed microarray can be completely filled without loss of the liquid sample from the chamber. The Shumate device is incapable of forming a continuous liquid column between the chamber ceiling and the test compounds attached to the bottom of the chamber without discharging some of the liquid introduced into the chamber.

Accordingly, the device disclosed by Shumate fails to teach a device wherein a cartridge is provided with a chamber having an inlet and outlet, wherein the cartridge is position in the system in a manner that the chamber is completely filled without the presence of air bubbles. To anticipate a reference must disclose each of the elements of the claimed invention. Shumate fails to teach a device wherein the chamber, the chamber inlet and the chamber outlet, are orientated in such a manner to enable complete and bubble free filling of the chamber. Accordingly, Shumate fails to anticipate the invention of claim 1 or any of its dependencies.

Furthermore, applicants also note that dependent claim 5 requires the inclusion of thermal interface for heating or cooling the chamber and the microarray device. Shumate fails to teach a device that comprises a thermal interface for that allows for the use of a heating or cooling element (i.e. heat transfer means) to modify the temperature of the chamber contents.

Accordingly, in addition to the reasons state above, Shumate fails to anticipate the invention of claim 5.

Claims 14-16 and 20 stand rejected under 35 USC § 103(a) as being unpatentable over Shumate (US 2003/0082632). Applicants respectfully traverse.

Claims 14-16 and 20 ultimately depend from independent claim 7. Claim 7 requires that the claimed cartridge is held in such a position in the system that the chamber inlet lies at a lower height than the chamber outlet, whereby liquid supplied to the chamber through said chamber inlet displaces air contained in said chamber and enables a complete and bubble free filling of said chamber with liquid, wherein excess liquid leaves said chamber through said chamber outlet. Furthermore, new claim 29 specifies that the cartridge is held in such a position that a plane defined by the active surface of said microarray device forms an angle with a horizontal plane defined by the base of said cartridge holder. In this embodiment, exemplified by Figures 1 and 2, liquid entering the chamber displaces the air in the chamber in a progressive manner so that no air remains trapped within the chamber. Accordingly, as shown in Figs. 1 and 2 the entire space between the optical interface and the active surface of the microarray is filled with liquid during the filing of the chamber. Accordingly, the claimed device allows for the complete and bubble free filling of the chamber.

Shumate fails to teach or suggest a device that is capable of complete and bubble free filling of the chamber. Accordingly applicants respectfully submit the presently claimed invention is patentably distinct over the teachings of the Shumate reference and respectfully request the withdrawal of the rejection of claims 14-16 and 20 for obviousness.

Claim 18 stands rejected under 35 USC § 103(a) as being unpatentable over Shumate (US 2003/0082632) in view of Wardlaw (US 2002/0055178). Applicants respectfully traverse.

Claim 18 is dependent on claim 17 and therefore is patentably distinct over the teachings of Shumate for the reasons stated above. The secondary Wardlaw reference fails to supplement the deficiencies of the Shumate teachings. Accordingly, applicants respectfully request the withdrawal of the rejection of claim 18.

Applicants believe that the present application is now in condition for allowance and such action is respectfully requested. If the Examiner has any questions or comments such that a conversation would speed prosecution of this application, the Examiner is invited to call the undersigned at (434) 220-2866.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John P. Breen", with a long horizontal flourish extending to the right.

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